

CLAIMS

We claim:

1. A composition comprising a first compound including immobilized metal atoms and/or ions capable of binding compounds containing a non-shielded purine or pyrimidine group and a second compound containing a non-shielded purine or pyrimidine group bound to a portion of the metal atoms and/or ions.

2. The composition of claim 1, wherein the second compound is selected from the group of RNA, single stranded DNA, and other molecules having a non-shielded purine and/or pyrimidine moiety or group.

3. An immobilized metal affinity chromatography (IMAC) column comprising a packing including immobilized metal atoms and/or ions capable of binding compounds containing a non-shielded purine or pyrimidine moiety or group and a compound containing a non-shielded purine or pyrimidine moiety or group bound to a portion of the metal atoms and/or ions.

4. A substrate comprising a plurality of ligands bonded thereto, each ligand immobilizing a metal atom and/or ion capable of binding compounds containing a non-shielded purine or pyrimidine moiety or group, and a compound containing a non-shielded purine or pyrimidine moiety or group bound to a portion of the metal atoms and/or ions.

5. The substrate of claim 4, wherein the second compound is selected from the group of RNA, single stranded DNA, and other molecules having a non-shielded purine and/or pyrimidine moiety or group.

6. An apparatus comprising a sample input unit, a separation unit, a detector unit and an analyzer unit.

1 7. The apparatus of claim 6, wherein the separation unit is a zone comprising an IMAC
2 matrix including metal atoms, metal ions or mixtures thereof capable of binding compound
3 having a non-shielded purine moiety, pyrimidine moiety or mixture thereof.

8. An apparatus comprising a substrate having an IMAC ligand coated thereon, bonded thereto, deposited thereon or deposited therein, where the substrate is adapted to remove contaminating compounds including a non-shielded purine moiety, pyrimidine moiety, or mixture thereof from target compounds including a shielded purine moiety, pyrimidine moiety, or mixture thereof.

1 9. The apparatus of claim 8, wherein the substrate is selected from the group consisting
2 of a porous stirrer, a filter, a membrane, an interior wall of a vessel, or mixtures thereof.

1 10. A method for separating compounds comprising the step of:
2 contacting a solution comprising compounds including a non-shielded purine or
3 pyrimidine moiety and compounds including a shielded purine or pyrimidine moiety with a
4 solid composition including immobilized metal atoms and/or ions capable of binding
5 compounds containing a non-shielded purine or pyrimidine moiety to form a supernatant
6 liquid having a reduced amount of compounds including a non-shielded purine or pyrimidine
7 moiety.

1 11. The method of claim 10, further comprising the step of:
2 separating the supernatant liquid from the solid composition.

1 12. A method for separating compounds comprising the steps of:
2 passing a solution comprising a mixture of compounds including a non-shielded
3 purine moiety, a non-shielded pyrimidine moiety or mixture thereof through a column
4 including an IMAC ligand, where the ligand is capable of differentially binding the

5 compounds; and
6 collecting purified samples of each compound.

1 13. The method of claim 12, further comprising the step of:
2 detecting each compound in an effluent from the column as a function of time from
3 at least one detectable property associated with each compound; and
4 determining the identity of each compound from the detected properties.

1 14. A method for purifying food stuffs containing purine and/or pyrimidine moieties
2 comprising the steps of:
3 forming a crude food stuff comprising cellular constituents including digestable
4 proteins and nucleic acid contaminants including a non-shielded purine moiety, a non-
5 shielded pyrimidine moiety or mixture thereof;
6 contacting the food stuff with substrate comprising an IMAC ligand, where the
7 substrate binds the nucleic acid contaminants; and
8 removing the substrate comprising the IMAC ligand having bound thereto the nucleic
9 acid contaminants to form a purified food stuff.

1 15. The method of claim 14, further comprising the step of
2 treating the crude food stuff with a DNase, endo or exo nuclease or other nucleic acid
3 digestion enzyme or agent prior to the contacting step.

1 16. A method for purifying a crude compound containing a non-shielded purine and/or
2 pyrimidine moiety comprising the steps of:
3 forming a crude mixture comprising a target compound and contaminants;
4 contacting the crude mixture with an agent including an IMAC ligand capable of
5 binding to the target compound to form an IMAC ligand complex;
6 separating the complex from the contaminants; and
7 recovering the compound from the complex.

1 17. The method of claim 16, wherein the compound is an AIDs drugs selected from the
2 group consisting of AZT or DDI, co-enzyme A, or mixtures thereof.

1 18. An assay comprising the steps of:

2 contacting a microplate substrate comprising wells coated with a composition
3 comprising a IMAC-oligonucleotide complex including an IMAC ligand and a single
4 stranded oligonucleotide having a first molecular and/or atomic tag bound to the IMAC
5 ligand; and

6 contacting a nucleic acid sequence including a second molecular and/or atomic tag
7 with the IMAC-oligonucleotide complex; and

8 measuring a change in fluorescence when the nucleic acid sequence includes a
9 complimentary subsequence to oligonucleotide due to an interaction between the first and
10 second molecular and/or atomic tags.

1 19. The assay of claim 18, wherein the first tag is a fluorophore and the second tag is a
2 quencher for the fluorophore.

1 20. An assay comprising the steps of contacting a substrate comprising a surface coated
2 with a composition comprising an IMAC ligand and a first fluorophore with an
3 oligonucleotide including a second fluorophore and measuring an effective Stoke shift such
4 that a large effective Stoke shift signifies oligonucleotide binding to the coated substrate and
5 a normal effective Stoke shift signifies no oligonucleotide binding to the coated substrate.